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ABSTRACT

Learning in the first professional job was examined in a study of 40 nurses, 27 engineers, and 16 accountants who were in their first full year of full-time employment after college in hospitals and firms located in the United Kingdom. Data were collected through the following activities: (1) interviews with the respondents; (2) 1- to 2-day visits to their workplaces; and (3) interviews with their managers/mentors and significant others in their workplaces. The first few months of full-time employment presented very different challenges and experiences across the three sectors. The accountants had 3-year contracts that included both training for professional examinations and work-based induction into the profession through a tightly structured apprenticeship system. Although the nurses had already qualified for their profession, they still faced a difficult transition because of their sudden assumption of extensive responsibility and immersion into a highly demanding, high-pressure environment with a very heavy workload. The engineers' workplaces all had accredited graduate training schemes. Across the occupations, informal support proved more important than formal support and social relationships were a significant factor in learning. (The bibliography lists 13 references. Appendixes constituting approximately 50% of the document contain excerpts from the field notes on and discussions of the experiences of new accountants, nurses, and graduate engineers.) (MN)

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AERA PAPER 2003

Learning in the first professional job: the first year of full time employment after college for Accountants, Engineers and Nurses

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Introduction

This paper reports findings from the first phase of a four-year research project funded by the UK Economic and Social Research Council as part of its Teaching and Learning Research Programme. The major component of this project is a longitudinal study of trainee accountants, graduate trainee engineers, and newly qualified nurses in England. This critical period of introduction to professional work has not been previously studied by a longitudinal series of observations and interviews, though a number of one-off surveys have been conducted. The three professions have been chosen for three reasons: (1) they play key roles in the UK economy and public services, (2) they use contrasting approaches to professional formation and (3) the applicants have prior experience of working with them and were able to find user partners wanting to participate in the research.

The accountants and engineers are formally contracted trainees, for whom employers have developed systems of organised training support. Hence we have added a second, action research, component to the study, which uses the findings of the first phase to assist our partner employers to make appropriate modifications to their first year support arrangements for new recruits. The evaluation of such modified arrangements with a new first year cohort will start in Autumn 2003, and findings from the second two-year phase of the longtitudinal study will also be too late for inclusion in this paper.

Research Questions

The first question comes from Eraut et al's (2000) study of mid-career professionals' learning in the workplace, while the second is a natural extension of that previous work:

1) To ascertain what is being learned, how it is being learned and the factors affecting the level and direction of learning effort; and contribute to theoretical understanding of learning in non-formal contexts.
2) To further develop research methods for investigating learning in the workplace.

However, in this project, we are interested in the extent to which novices, whose learning is more explicitly on the agenda and who have far less experience, learn differently from the mid-career professionals, whose learning was found to be largely implicit, taken for granted and difficult to elicit or elucidate. Hence the other two questions are more directly associated with the transition from Higher Education into employment:

3) To investigate the use and extension of prior technical knowledge and generic skills brought into employment from higher education and other life experience; and contribute to theoretical understanding of transfer.

4) To make recommendations for the development of evidence-based practice in the management and support of newly graduated and /or newly qualified employees.

Methodology

The methodological problems encountered in the previous study of mid-career professionals were discussed in Eraut et al (1999). In this current study the recognised novice status of our subjects, as well as better funding, made it possible to base our data collection on short (1-2 day) visits to each subject's workplace, rather than interviews alone. The additional features are prolonged periods of observation, interviews with trainees' managers / mentors and brief discussions with significant others in the workplace. This enables us to use workplace documents and activities as starting points for conversations about embedded knowledge and its acquisition during subsequent interviews. Four visits are to be made to each subject in the longitudinal study, and this paper reports findings from the first visits to all participants.

The majority of our subjects were recruited through 12 partner employers and a minority through their Higher Education institutions. This paper concentrates on groups of 6-8 novices recruited by the partner employers, a sample of about 90 subjects, some of whom were first contacted through their universities. The rationale for this approach is that each subject is located in a different workplace or succession of workplaces. Our sampling strategy is designed to maximise our ability to differentiate between individual, local workplace and organisational factors affecting learning within a basically qualitative research approach. The group discussed in this paper comprised:

40 nurses from 6 district general hospitals or teaching hospitals.
27 engineers from 4 companies in avionics, building services, civil engineering and telecommunications.
16 accountants from large 'Grade A' firms, i.e. neither from the big four international firms nor from small local practices.

Theoretical Perspectives

This discussion is organised around three main questions:

- What is being learned and how is prior knowledge being used and expanded?
- What is the influence of the structuring of work and learning and of social relations in the workplace?
- What factors affect motivation and engagement in learning in the workplace, and are they amenable to modification by appropriate intervention strategies?

Our perspective on the first question about prior knowledge and learning follows the published findings of the previous project on the learning of mid-career professionals (Eraut et al 2000) and an earlier project on how nurses learn to use scientific knowledge in practical situations (Eraut et al 1995). These encountered problems associated with tacit knowledge, non-formal learning, the denial of the need for substantial further learning before being able to use theoretical knowledge in practice, and debates about appropriate approaches to the representation of competence and expertise. Issues concerned with transfer of knowledge from college settings to workplace settings are discussed in Eraut (2003).

Our framing of the second question on work structures and social relations has developed significantly in the last two years (Eraut 2002, Miller 2002). Both the accountants and the engineers are formally contracted trainees, who are expected to take professional qualifications involving assessments and/or examinations, as well as engage in learning on-the-job. Hence engagement in off-the-job learning activities is an integral part of their work; and it is appropriate to use the same four structuring dimensions for both types of learning context. These are:

1. The nature, range and structure of work activities
2. The distribution of work activities between people and over time and space
3. The structures and patterns of social relations in the workplace
4. The outcomes of work and learning, their evaluation and the attribution of credit/praise or blame.

Key variables affecting the extent to which the **activity structure** requires, facilitates or inhibits learning in the workplace include:

- the range and variety of activities making up a person's job, both during a specified period and over time
- the extent to which activities involve transactions with co-workers, clients/customers, suppliers or other outside people
- the extent to which activities allow flexible decisions to be made at the discretion of individual workers or their immediate managers, rather than being totally programmed
- the scope and demand for inventiveness, problem-solving or creativity from individuals or teams
- the extent to which the activity structure encourages or provides time for meta-level activities such as planning, reviewing, strategic thinking, or quality improvement
- the degree to which the activity structure makes it difficult for individuals and/or groups to perform at the level of their competence
- the nature of formal and informal communications within the workplace and across its boundaries
- the congruity between the activity structure, short term organisational goals and strategic priorities.

We also found that, in spite of the affordances offered by modern communications technology to transcend some of the constraints of **time** and **space**, most social relationships and informal exchanges depend on people being together in the same place at the same time. Working relationships and the exchange of information significantly depend on mutual trust and regard, and the development and maintenance of such trust, as well as awareness of and respect for other people's perspectives and expertise, are greatly facilitated by informal contact. This may arise through **co-location** of work, incidental encounters, and opportunities for informal exchanges around the edges of meetings, or in social time in or near the workplace (typically over coffee or lunch).

We are particularly interested in the extent to which **social relations in the workplace** are best described in terms of (a) an ongoing working community in which a small number of trainees or newly qualified staff happen to be present or (b) a learning system in which the business of being a trainee or supporting a trainee plays a prominent role. The advantages of (a) are considerable when the context is that of a community of practitioners for whom mutual learning and the development of practice are natural goals. In such contexts trainees or newly qualified professionals are valued from the outset as contributors to the work of the group, thus confirming their professional identity, whilst also being inducted and socialised into a learning / working community. This type of working community is ideologically attractive, as the flood of citations of Lave and Wenger will testify; but Eraut (2002) has questioned the frequency of its occurrence, citing reports on work contexts where participation is limited, trainee status is low and constructive feedback is conspicuously absent.

Model (b), based on formally organised systems of learning support, appears to give greatest priority to learning, but this may not happen in practice for several reasons. It requires that a learning system be maintained quite separate from ongoing work. This sets up competition for time and attention between learning and working, with trainees being seen as net consumers of time and effort rather than contributors to the work of the group. This may not lead to more learning opportunities becoming available inside the workplace itself. Moreover, the evidence of research to date suggests that social relations in the workplace are largely constructed at the local rather than the organisational level. It is the local manager who has the greatest influence on the level of mutual support; and also, in some contexts, on the allocation of work (Kozlowski & Hults 1987, Rosenholtz 1989, Tracey et al 1995, Eraut et al 1999).

Variations in support for recruits are often attributed to variables such as class, gender and ethnicity. But Fessey (2002) observed that student nurses and newly qualified nurses on a surgical ward were given more opportunities to learn new techniques and procedures if they were perceived as generally willing to do things and help out in a crisis; and the cumulative effect of such differentiation could have a large impact on their overall professional development. While Miller, Ross and Alderton (1998) found that nurses' stages of acceptance into a clinical team were related to their ability to ask questions and to seek opportunities for learning. Where colleagues under pressure see advantages in

developing a novice's contribution as rapidly as possible, they may perceive supporting their learning as a trade-off for receiving greater help in the future; but this depends on novices not being moved on too quickly for others to reap these benefits. It may also depend on desperately busy professionals being able to manage their time and attention accordingly.

Another important issue is the variable priority given to different outcomes of work and learning. Formal discussion of outcomes is often confined to periodic appraisals, conducted with varying degrees of professionalism. Often appraisers' lack of reliable information about long-term outcomes gives short-term outcomes more influence than might otherwise be appropriate. Both formally and informally, some outcomes are given greater attention than others, which in turn affects the way in which workers deploy their time and effort. However, problems occur when outcome priorities differ significantly from activity priorities. If the conflict cannot be resolved, the most likely result is profound alienation.

Our framing of the third question, on contextual influences, starts from previous work (Alderton 1999), which identified three interacting factors -- the learners' confidence, the challenges of their work and the support they received from managers and colleagues in meeting those challenges. These in turn related to self-efficacy, personal qualities, the micro-culture of the workplace and how they were managed.

Data Analysis

In a project whose findings will be based on the longitudinal analysis of large data sets of qualitative data it is necessary to provide reassurance that, among other things, the way the data has been coded is robust. Accordingly we have established an audit trail which documents how our coding scheme has developed (and continues to evolve), and relates to the theorising of learning at work and the factors that affect such learning. This is a brief outline of the trail.

The first stage comprised a series of discussions within the team of the kind of questions to be asked in the early interviews. The discussions rested on previous theoretical and empirical studies, and were led by the two project directors who had recently researched in nursing, health care, engineering and business. (See Eraut et al. 1998 and Miller, Freeman and Ross, 2001). The discussions were minuted and resulted in the generation of a number of sector specific, semi-structured interview schedules. These reflected expectations of what early data should be collected to support a sequence of subsequent visits and interviews.

The schedules were then used in telephone interviews with students as they left their HE courses, and in the first round of visits to their places of work. The interview transcripts provided the basis for the second stage. This took place as data was being gathered, and involved the examination of transcripts sector by sector to identify the key data and main messages. At this stage stress lay on reading each sector on its own terms before making

any cross sector comparisons, and on uncoupling the data from the questions that had been used to obtain it. This work required much revisiting and time for team members to digest and interpret the data. An initial set of codes was produced while further discussion of the theoretical implications produced a cluster diagram that illustrated the project's focus on the interface between an individual new employee and their employing organisation.

At this point we were becoming increasingly concerned about how we would be able to handle nearly 400 transcripts. So we decided to introduce an intermediate stage in our analysis in the form of a "visit report", which combines field-note evidence with an account that summarises an interview using a mixture of paraphrasing and quotation. Passages from the transcript were only quoted when the exact words were considered important, because of either their detail or their ability to precisely portray an authentic view of an event or issue. Such reports are 5 to 8 pages in length, whereas interview transcripts alone can be between 10 and 30 pages. We would then code the visit reports rather than the transcripts for later comparison and retrieval. The advantages of visit reports are that:

1) They bring together pieces of related evidence from different parts of an interview, thus reducing fragmentation.
2) They are much more readable and user friendly, thus improving the process of respondent verification. Some respondents had clearly felt overwhelmed when asked to validate a lengthy interview transcript in an unfamiliar format, and did not feel very positive about their ability to communicate; whereas accounts made them feel more positive about what they had said. They found them easier to challenge, and were more likely to amplify accounts on request.
3) Creating the accounts itself involves us in a degree of interpretation as responses are brought together, summarised, reordered and partly paraphrased. This is a valuable first step towards understanding and interpreting the interview data. Thus, instead of validating the transcript itself, respondents validate our interpretation of the transcript, which also encompasses the first stage of data analysis. (The original interview and other data are still preserved on file for reference if a respondent were to question the accuracy of an account, or to aid appropriate coding.)
4) Visit reports are more memorable than transcripts, so researchers analysing them will become more familiar with the data and able to synthesise it more easily, using the systematic coding to retrieve data and to support and check their analysis, not to do it for them.

Additional considerations then came into play as the tentative coding scheme was once more subjected to theoretical scrutiny and tested against a sample of accounts from the three sectors. First, there was a need to ensure that the coding scheme would be able to deal with data from second round and subsequent visits and interviews. Second, it was necessary to finds ways of including observational and contextual data. Finally, there was

a fresh return to the project's original research questions to ensure they would not be overlooked.

An important reason for documenting this audit trail is the project's whole approach to data coding. We occupy a position that is not quite that of modern, 'grounded theory' and its approaches to data coding. Nor have we attempted to code on the basis of a pre-existing theoretical stance. We are somewhere between, probably closer to the first. Neither our interviewing nor our coding have been tied to our original theoretical analysis; but we have been careful not to omit collecting data that our theory would predict to be important. We do not believe this will weaken our warrant, because we will use more than one reader to check the process of moving from "transcript, to visit report, to coding", for a sample of each set of transcripts.

Findings from each sector

The first few months of full time employment present very different challenges and experiences across the sectors. The **accountants** have 3 year contracts that include both training for professional examinations and a work-based induction into the profession through a tightly structured apprenticeship system whose special features are:

* immediate allocation of real tasks, which gradually increase in size and complexity; this steep learning curve develops their confidence
* working for at least half their time on clients' premises on relatively short assignments (generally 2 days to 2 weeks) with tight timetables
* the need to admit ignorance and continue to ask questions; the shy would not survive
* receiving most support from trainees 1 or 2 years ahead of them, who remember their own early period and are receptive to "ignorant" questions
* engagement in work which is scaffolded by the structure of the working files, access to the previous year's audit, pre-prepared protocols and tests that frame their work and specify their sampling procedure, and working alongside more experienced colleagues
* developing greater understanding of audit processes and products while working on individual tasks that contribute to them.

Several of these features can be seen in the excerpts from a visit report shown in Appendix A. These also show the importance of teamwork, relationships with clients and time management in a context where information is continuously being sought and checked, with procedural decisions being made at frequent intervals within a relatively clearly defined framework of tasks.

Trainee accountants also receive formal training from private specialist training companies to prepare them for professional examinations, where failure to pass could lead to loss of employment. At this stage the main influence of this formal training is to

create further demands on trainees' time, most of which are reflected in their work schedules. Relevant content from this formal component of their training is expected to begin to influence their workplace learning at a later stage.

The **nurses** have already qualified but still have a difficult transition, caused by their sudden assumption of a great deal of responsibility and immersion into a highly demanding, pressurised environment with a very high workload. Critical features of this transition are:

* learning to manage their time, to prioritise the numerous demands upon them, and to recognise when patients need urgent attention
* being given immediate responsibility before the above has been achieved
* learning how to handle a whole range of challenging communication tasks and relationships with doctors, colleagues, other professionals, patients and relatives
* taking responsibility for the administration of drugs according to a wide range of schedules and using several different methods, while still attending to the needs of a considerable number of patients
* coping with shifts when they may have very little support
* learning a range of new procedures with varying levels of help
* peripheral learning is limited by the urgent demands on their attention
* often limited contact with other members of their peer group
* varying levels of support from more experienced nurses
* access to relevant short courses is often constrained by staffing shortages.

They are all quite critical of their training, especially the disjunction between theory and practice, the lack of attention to scientific knowledge, and the pattern of work placements. Most of them are thinking about their next move, often to a more specialist ward in the same hospital.

Appendix B describes a nurse learning to prioritise, and to quickly assess new admissions in a crowded, very demanding, open access paediatric ward. Appendix C describes the emotional impact on a newly qualified nurse of being given too much responsibility and too little support, even after a critical incident.

Our partner **engineering** companies all have graduate training schemes, accredited by the relevant Institutions as appropriate for graduate engineers seeking Chartered Status. The other Institution requirements are a portfolio of work cross referenced to their Chartered Engineer criteria and an oral examination based on their portfolio. Engineer graduates are keen to pursue this opportunity, but not those from Maths or Computer Science. Critical features for engineering trainees are:

* working in an "open plan" office with desks adjacent to team members, line managers and senior engineers, making it easier to ask questions and to participate in discussions. Getting to know who does what, and the range of available expertise/skills around them is an important early requirement.

* a strong base of support from a wide range of mentors, managers, and team members in addition to accessible "happy-to-help" people within their own branch of the company and also in other branches. Contacts take the form of face-to-face interaction, telephone, e-mail, or fax.
* all companies have a variety of on-line training courses/exercises for the graduates' own-paced self-learning, but it appears that there is no monitoring system to check on the progress of those using such facilities, and trainees believe it is up to them to use this provision only if they feel so inclined.
* some companies have a national "skills link" whereby a graduate can log their enquiry into the system from their desktop, and this will be accessible to all people on that site and elsewhere within the firm; anyone who can help may suggest either an answer or the name of a helpful person to contact.
* strong agreement on the benefits of having previous practical experience such as an industrial placement or a sandwich year
* views of HE are influenced by their immediate job needs and by the level of contact with industrial engineers
* access to short courses is good
* interest in the job is important, and carrying out challenging, real-world tasks is thought by graduates to be the most effective factor in learning
* graduates believe that they learn most from doing things under supervision, followed by learning from senior engineers (observation, discussion, etc.), and attending courses, reading and finally informal open learning
* graduates and their employers judge them as being strong in IT and its many applications, but weak in report writing and presentation skills
* they often work on large projects with long time-scales but would like to understand more about how their tasks contribute to the overall project
* a number of graduates find that they are engaged on too many simple, routine even repetitive tasks. However, they recognise the general benefits of some such activity, particularly early in their employment.

Trainees in small companies and local authorities get less support for gaining Chartered Engineer status; but there are more opportunities for on-site work and personal decision making/judgement, etc., thus providing a fast-track route towards a more rounded experience.

Appendix D describes one of two incidents we observed when graduate engineers encountered a lack of organizational memory or missing expertise leading to a reframing of the problem. It is one of many ways through which they both come to know the technical and personnel resources of their company and the constraints of outsourcing; and are inducted into the engineer's art of "muddling through".

Appendix E describes (1) the challenge for a graduate engineer of diagnosing defective parts and getting to know "real life systems"; and (2) his discerning use of different types of informal support. Whereas Appendix F presents a contrasting case, where lack of

feedback and lack of challenging work were beginning to lower another graduate engineer's morale.

General Conclusions

1) The methodology is working well and giving us rich data.

2) The theoretical positions in our original proposal for the research is proving robust, and being deepened and further developed as we proceed. In particular the structure of the work and its environment(s) is proving very important as it affects the level of challenge, the availability of timely support and opportunities for peripheral participation.

3) Informal support is more important than formal support; social relationships are a significant factor in learning.

4) Mentors play a useful secondary role in engineering, providing support for the Chartered Engineering application and general career guidance.

5) Learning to use knowledge acquired at university presents significant challenges for both nurses and engineers.

6) The pressure of work seems to have a positive effect on teamwork in accounting, is too high for sufficient reflection in nursing (where it also affects retention of staff in the profession) and tends to be too low in engineering (perhaps some companies are short of work?).

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APPENDIX A: Excerpts from Interview Account and Field-notes from first visit to Trainee Accountant A6

Trainee accountant A6 had been working with her first accountancy firm for about seven months and had worked on five or six audits. The following excerpts are based an interview with A6 at the end of 2 days observation

At this stage a typical day in a client's office normally begins with looking at last year's figures, reading the tests and discussing the work with seniors. Trainees then collect relevant documents, discuss them with clients if necessary, carry out the tests which have been pre-programmed in the accountants' office and discuss the results with seniors, pointing out anything unusual. If necessary, points may be discussed with the client, and eventually a conclusion will be written. Very new trainees are given only parts of sections but, as they develop expertise, they are given responsibility for a whole section.

"At the beginning you'd be given little tests, say, part of a section and you don't really know what you are doing, you're just ticking or adding up these things. As time goes on you're given a whole section so you know exactly what you are doing and why you are doing this and then you get your own little result at the end; so you are not just doing little tasks for someone else you are doing your own work."

As her experience increased, so did her understanding of the results. *"Now I know if I get a certain result it means this and if I get this result it means something else ... and sometimes a result means there is more work to do or different work to do."* At other times trainees may be carrying out tasks such as filing in order to help the seniors. At the end of each day work must be replicated and often there is a meeting in which trainees are instructed about the tasks required the following day.

There is a tension in allocation of tasks. Trainees need to be involved in a variety of tasks in order to extend their experience, but of course they are more efficient once they have acquired the experience. Managers are obliged to balance the demands of the job against the requirements of the trainees as best they can. Trainees can ask for particular tasks, although they may not be allocated them if the demands of the work prevent it.

She stressed the importance of relationships with colleagues in finding out what she needed to know:
"They have all been where you are, you have to learn that you can't sit there and just pretend or just try and not do a piece of work because you don't understand. You have got to ask straightaway or you will feel more insecure about what you are doing. I think clearing up any insecurities you have got as soon as possible is really important because no one expects you to know".
The two colleagues with whom she was working *"are really friendly people but they are not all going to be like that so you need to have a little bit of aggressiveness, not really aggressive, but enough to say 'can you explain this to me'. One thing about this organisation is that there are hardly any people that are shy".*

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Observing and copying the way that more experienced colleagues operate is essential in learning how to work in the organisation:
"There are little things that other people know, just on how you treat other people and how you get something done, or how you ask for things ... you just pick up things that they do with each other, it's a bit like school ... the more that you see and the more that you learn the more confident you become." In one particular instance, she was working with someone only a year above her, and *"I saw him finish something and he had a look through the file, because when you look through a file you can see what has been done, and he'd say 'well this has not been done and I did this last week so do you want me to go and ask the client now?' I thought I can do that, I can say 'I did that last job do you want me to go and do it' and it's just so much better than saying I have got nothing to do. I think that was when it changed because I started thinking I can do things for myself and I am not just an employee I am supposed to be part of a team. I felt before that I was a bit of a tag along, they were the team and I was someone who was learning. Since then I have tried to make sure that I am part of it rather than just an outsider that is trying to learn."* When you are part of a team: *"You feel useful and you are useful."*

"Things have changed the way that I think ... it's mostly how people react with each other that are a year ahead ... and the way that they work together." She explained what she was learning generally in the course of her work:
"You know what things you need to do to do something well; you know what sort of level you need to get at, what is expected of you and what is more than is expected; so you know what to aim for and what to build on; also what seniors are grateful for, what kind of things can help them out if you offer to do some of the mundane jobs. Quite often they feel bad about giving them to you, and if you're not too busy and you can see that they have got a real mess of a file and bits of paper, and you say do you want me to sort that out for you then I think they are grateful for that. They don't have to feel guilty making you do rubbish work".

She mentioned that manuals were not very helpful, and once again reiterated the importance of learning from people. *"[There's] an audit manual which gives you guidance on how to do all of the tests but, when you first join, it's not a lot of help because you don't understand the words ... the only learning at all really is the people."* Her knowledge had increased considerably, it is: *"Just so much more than it was. It's a really steep learning curve and you probably do learn the most in the first six months. Obviously you keep learning but the amount that I have learnt in this six months, I don't think I can carry on doing it for the whole three years".*

Her confidence is strengthened by the fact that she is dealing with colleagues who are second- and third-year students:
"I can ask them anything. Also this [audit] is quite an easy job and I think that this is the stage where my confidence is beginning to come because I don't feel I have to ask questions every five minutes ... so I think this is when it is beginning to come together".
She is aware of her price: *"We're charged about forty-five pounds an hour and, when we*

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first joined, we were useless ... it is usually quite time-pressured, because every hour I spend costs them more money."

Her confidence is increased particularly when the manager praises her:

"You feel they have noticed I have done something and you try harder. It is like a direct effect. Next time you think I want someone to say that to me again and it does make you feel it is nice to be part of a team. It is one of the things I really like about the job you are always nearly always part of a team and so you get that sort of thing where you all pull together at the end especially if it is rushed. It is nice to be part of that and to feel that you have helped them finish it in some way or played your little part."

Field-notes (J is a senior trainee in charge; Tom, Phillip and Bob are client staff)

Day One, 1.30

A6: *I have to do the typing up, check the lorry tomorrow, and the purchases.* J: *And the payroll and the cash, check with Tom. You may not need to do the cash at all, ask him what is the level of cash sales.* A6: *What amount of cash?* J: *When the driver takes cash.* A6: *But at what level?* J: *Good question. We didn't test it last year. Planning says (check pc) if materials are more then £80,000.* A6: *That's probably quite unlikely.*
A6 hole-punches papers and puts them in J's file. A6: *Cash is usually about £11,000 per month, but always with the same people.* J: *Do the other systems and I'll think about it.* A6: *I'll look through last year's papers and type up this morning's information. You can look through my papers tomorrow.....*

2.45

A6: *Do we want the same information from the payroll as in previous years?* J: *Yes, but follow up one person in particular. Check their overtime and clock card.*
A6 finishes typing, returns to taking notes from the ledgers. Returns to lap top. Checks figures already inputted. Checks flow chart.
Finds Tony to talk through purchases. Tom: *Start with purchase order.* He produces a file with the majority of the purchase orders. A6: *Do you have separate records?* T: *Phillip does.* These are machine-created (large computer printout). A6 picks 2 from sheaf. Tom photocopies and finds on screen. He takes down relevant paper file from shelf of files re deliveries. He demonstrates the reference. The driver hands the delivery note to the clerk, who codes and enters into computer. When invoice arrives, it is checked to confirm that it matches the total. If it doesn't match, it goes to a paper query folder. Otherwise, it goes to the main folder. The invoices are posted 6 – 7 times a month by Tom and Bob. The batch is added by machine, and checked against the manual addition. Tom volunteers that there is no change from last year.

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APPENDIX B: A nurse learns to prioritise on a paediatric ward

N5 says that there is a "*loose routine*" on the ward for managing the work. Most staff do long days from 0730 to 2130:

"...generally hand-over is at half seven so normally by the time that's done you're out by half eight onto the ward, generally just check all your drug charts and things, give out any medications that you need at that time, the ward round starts at around half past nine and that can go on to about eleven, half eleven depending on how busy and then it's just, you get into the habit of just then sorting out all your discharges, getting all their charts down to pharmacy so they're up for the afternoon...if you're on a late [shift] you come in at half one-ish and by then most of that's all done and out the way, so you're more discharging patients than any new admissions, you don't get caught up in the ward round..."

The nurse in charge for the shift allocates the nurses on duty to an area of the ward after handover. N5 says that she is expected to join the doctors on their ward round whilst they see the patients she has been allocated to. This can last for up to an hour and a half.

N5 explains that during handover the nurses have a pre-printed sheet with the patients' names on and why they've been admitted. The nurse in charge relays verbally any relevant information about the patients' conditions:

"We have a print-out with the names and just a vague description of why they came in and then as you're handing over you get told what kind of medications they're on and if they're on IVs or orals, whether there's any social problems, all that will get handed over, any special feeding regimes, or skin regimes, depending what they're in with ..."

N5 talks about her priorities for a shift and what she does first after handover:

"...because we're mixed medical / surgical often if you've got somebody for theatre that will be your priority or IV drugs if they're due, they're normally quite high on prio[rities] or any medication that's due at eight o'clock, or if you've a child that's been particularly poorly they will generally be your priority before you worry about anyone else..."

She says she can tell which patients are the priority and sometimes which patients are going to need her the most during the shift, although this might change as the day progresses:

"...because some of our patients are either with us all the time or come and go quite frequently, you generally know how often you'll be tied up with them and often it's quite a lot, because they're on a lot of complex feeds or lots of medication every couple of hours...It can change, you can get an admission and that will throw everything out of balance, but generally you've got an idea about who's going to need the most time.."

Sometimes patients with social problems can take up a lot of time too since N5 might have to liaise with social workers and other members of the team as well as dealing with different visitors for the patient.

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N5 talks of what she does when her plan is disrupted. If she gets an admission then this takes priority over anything else:

"...when the admission comes in it generally doesn't really matter what you're doing, even if it means your drugs are going to be ten minutes late you go and assess the patient, even if it's a quick: are they blue, are they breathing and generally you do a set of obs[ervations] before you do anything else because again different from I think most hospitals we have an open access status where a lot of again the patients that come and go back to us, they can just give us a ring and just turn up on the ward if they're worried about them and on a few horrible occasions we've had children come in that are really poorly and obviously they haven't gone through A&E [Accident & Emergency] and the resus[scitation] room first, so you can end up with a collapsed child on the ward so generally everyone checks any admission, whether they're, or we get direct GP {family doctor} referrals again they don't have to come through casualty and occasionally we've had children come in that are really quite poorly and then you just have to again assess them and see whether they're going to need a lot of care, and you just have to kind of rearrange your plan, it's normally hectic for about an hour, half and hour, an hour and then you've got your plan back in your head and it's okay..."

Because the ward has an open access system, the nurses have to be ready for anything that comes through the door. N5 admits this isn't ideal and is something that the nurses don't really like.

N5 says that the nurses don't receive any extra training to deal with these emergencies:

"...you do your basic resuscitation skills and things but other than that no [extra training], I mean it's very rare that they're quite extreme examples but it's possible that it could happen every day ..."

N5 says that she didn't really know what to do at the time when she admitted the baby with the rash and realised he was sicker than she had been led to believe, but she had support from the team on the ward and this helped her through:

"...it's all a bit of a blur (laughter) I mean luckily for some reason I went in there and I did assess them straight away which hadn't always happened up until then and it was just a case, it was quite obvious that this baby wasn't (as) well as the family doctor had made out so really it was just do observations and then get the doctor straight away. It didn't need full resuscitation or anything but you tend to just lead each other through it, because I think everyone's a bit, the adrenaline starts pumping and you're all a bit frantic at first, but you just all kind of get talked through it so it wasn't too bad at all..."

N5 feels that she has got better at prioritising since she started on the ward and can now 'pick out' what is important during handover:

"...it comes with practice because I think originally say you're given 6 patients, you tend to go round them in order of how they are first of all but you do get used to once you're in hand-over picking out those that will need medication or those that have been particularly poorly or those that are going to theatre and obviously the theatre starts early so they're bit of a priority but you do pick it up..."

She has also learnt this by watching how other nurses prioritise:

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"...I suppose you see everyone else and they seem so organised and they seem to have it down to an art and you think 'Oh well maybe if I did that' and I don't know, it's hard to look back and remember but I think it was more from looking at other people and thinking 'Oh well yeah, that's a good idea to get all of that out of the way first'..."

N5 feels that she prioritises certain things now without having to think about it:
"...I don't think you realise in handover that you are listening out for things like that and even if somebody says 'Oh they're on IV antibiotics' but you're not sure what time, you tend to automatically check things like that first because otherwise it might be ten o'clock before you look at the IV board or drug chart..."
Sometimes she is not aware that she is doing these things, unless it gets really busy:
"...if it's really busy you do have to stop and consciously make an effort to, if there's lots going on you need to sit down and think about what you're doing first, but generally it just comes naturally now..."

N5 says she generally knows what things to look for when she is admitting a patient and that she uses the admission form as a framework to work through rather than answering every question on it:
"I think generally when you first start you're going through like question by question whereas now you try, I mean it probably sounds like I was just asking hundreds of questions but you do try and get answers as they're talking you tend to pluck your answers out, you don't always necessarily have to go through every single [question]..."

N5 explains that whilst she is writing, she is also assessing the patient:
"You tend to do it all at once, you're kind of half-assessing them, you're trying to suss out what the family relationship is...a lot of the time social problems are picked up just by speaking to people..".
She's also looking for cues from what they say and how they behave:
"...you don't always know you're doing it but you do sort of pick up a lot of stuff, even though you're not asking direct questions maybe of who's at home or you may actually turn around and say 'Oh is there a social worker with anyone in the family?' but they're the things that you tend to draw out even though you don't realise you're doing it..."
"...you may get a GP's {family doctor's} letter saying they're complaining of a stomach ache but they might be bounding around the ward; or other times the child saying no they're fine but when you actually look at them you know they're frightened to move their body or something, if they know it's going to hurt... A lot of that you pick up because you can ask them and they'll turn around and say 'Oh no I'm fine..' but it's because they're worried about what you're going to do if they say they're in pain...generally you get an idea or again if somebody's come in with feeding problems, you do know fairly quickly after looking at them for a minute or two, how severe [it is]..."
N5 thinks she has developed this skill since she qualified, although she knew from her training what she should be looking out for:
"I think you develop it I mean you kind of know in your training that these are the things you're supposed to be looking out for but you do tend to stick to, you do your set of observations, you ask them how they feel, you get the information by going through your

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questions and it's only with practice that you get used to thinking "Well okay they say they're fine, but it's quite obvious they're not" or you get the other way round where they say they're rolling around in pain and agony but you distract them by talking about Bob the Builder and they're bright as a button and jumping on the bed..."

APPENDIX C: Emotional consequences of lack of support for a newly qualified nurse

N29 feels that support on the ward was lacking when she first started. She had 2 weeks supernumerary but took patients from day one. She only worked with her mentor a couple of times during this period. N29 feels that her mentor is a *"bit of a gossip"* and so she doesn't trust her. They also have different ideas of what a mentor's role should be:
"I said to her in the first week 'How does this work?' I said 'Do we set up meetings' and she said, I always remember her reply, she said 'Oh I'm not actually here to teach you'. She said 'I'm here in case you get a problem' she said 'It's not like when you were a student, I'm not actually here to teach you things' so I never asked after that (laughter.) So I don't know what she thinks the role of mentor is, yes she's not here to teach me things, she said 'I'm only here if you have a problem and then we can meet up'"
This mismatch in expectations meant that N29 had very little contact with her mentor after this incident and so felt that she hadn't learnt anything from her (other than to steer clear of her). N29 feels that there are other staff members on the ward who she can go to if she has questions about clinical problems.

N29 didn't receive an induction pack or booklet about the ward. Apparently there is a booklet for students so N29 "*nicked*" one of these. She arranged 3 visits to other departments in the Trust that have dealings with the ward but this was not appreciated by the ward Sister because it meant that N29 would be having time off the ward:
"...she said 'We don't want you spending too much time off the ward' she said 'Because you're actually a member of staff now' so I mean your first day you're given patients, there's no settling in period...".
N29 was told at interview that she wouldn't be in charge for 6 months. However, she was put in charge of Z in her third week, ward with an agency nurse:
"I said to them 'The Sister said that this wouldn't happen for 6 months' and they said 'Well this is the job, get on with it'..."
N29 found this terrifying and would call a friend for support:
"...my friend works up in Orthopedics...and I used to ring her up and say how frightened I was: 'They keep making me be in charge and I don't want to be in charge'..."

N29 thinks that there are two types of support: formal support like study days, and emotional, more informal support:
"..to me there's sort of two lots there's like the formal support which is study days etc.; and I don't seem to be able to get on those because we are so short-staffed. Then there's the emotional support, now everybody on the ward is really, really friendly and they're

always saying 'Oh how are you' this, that and the other; so the emotional support within the team, I think is quite good.."
N29 also feels supported by her peers who she trained with:
"...quite a good network is fellow newly qualified we ring each other up and have a good moan down the phone 'Oh no they don't do that on my ward' 'Oh well they do on mine what am I gonna do about it'.."
N29 goes on to say that support from the team mainly consists of going down the pub after work, something which she doesn't enjoy doing:
"I mean the culture of this ward is that everybody goes out to the pub after a shift so, whoever you're working with, it's just on mass to the pub.."

N29 gives an account of a critical incident involving a dying patient where support from the ward team as a whole seemed to be severely lacking. N29 was on a night shift on Z ward on her own with a Health Care Assistant. This was her first night on this ward because the allocation was changed owing to poor staffing levels. The incident concerned an elderly patient who had dementia and a gastric complaint. The patient kept calling out all through the night and vomiting faeces. This patient demanded all of N29's attention throughout the shift and so N29 rang the Night Sister who came up to the ward to help. The patient deteriorated throughout the night and in the morning N29 had to ring his son to explain that his father's condition had worsened. The patient's son was very distressed. The doctor was bleeped in the morning to review the patient but then an hour or so later the patient died. N29 then had to ring the patient's son again to explain what had happened. N29 handed over to the day staff at shift change and not one person asked her how was feeling, even though she said that she was going home to have a good cry about the situation. The patient's son also arrived on the ward just as N29 was going home and burst into tears, so N29 explained what had happened. When N29 came on shift 2 nights later, she was told that the son had complained about his father's care that night so she had to go through the whole incident again with the Night Sister and make a statement. The son wanted to talk to N29, but she felt she couldn't see him so he came in and spoke to the doctor instead. Nobody on the ward asked N29 whether she wanted to talk about this incident:
"...nobody asked me if I was alright and that's probably one of the things that has made me make up my mind to go [leave the job] as well, it seems as if death is taken sort of as a familiarity here and they don't like have a debriefing or anything afterwards I mean yeah they all go down the pub and drink themselves stupid but I can't deal with it like that..."
N29 blamed herself for this incident and *"...went through it all with a fine tooth comb..."* to see if there was anything else she could have done. She says she could have asked someone to go through it with her but then she says *"..you feel a bit of a twit really..."*. Clinically she thinks she should have phoned the doctor sooner and insisted he come down but she did have the Night Sister with her and also she's not sure if this would've gone down well because *"...you have to be a bit diplomatic around the doctors"*. She feels she got too involved:
"I suppose I got a bit too involved really...I mean I don't usually but it was just the fact, this poor bloke all night 'Oh God I want to die, I want to die' but every time I went over

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to him, he held my hand and sort of calmed down, he stopped shouting every time I went over to him..."

Another factor was that no-one kept N29 informed of how the complaint was proceeding whilst she was on nights off. N29 was at home worrying that she was going to lose her registration and no-one rang her to say it was all cleared up:
"...I thought 'Oh I'm gonna lose my job, I'm gonna be suspended, that'll be my pin number up the spout and I've only been doing this for nearly 6 months' and I don't think I saw her [ward manager] for about a week and then I just said to her 'Is there any come-back about that complaint the chap said' and she said 'Oh no' she said 'One of the doctors spoke to him and he's absolutely okay about it now' and that was all she said...".
Indeed, some staff seemed to think it was a trivial incident:
"I said 'God I've been sitting at home for a week thinking I'm going to be suspended, I'm gonna lose my pin number' and one of the nurses turned round when I told her and she said 'Well if that's the worst thing that happens to you then you're not doing too bad'...which I didn't think was very supportive at all, that probably means I'm in for a life of complaints being made against me yet she actually said to me 'What are you moaning about' she said 'If that's the worst thing that happens to you then you're not doing too bad'..."

Because the ward is short-staffed N29 has not been able to do many study days and has only done her basic life support day. She asked to do the high dependency day but was told there were too many others in front of her, so she had to go to the back of the queue.
N29 is worried that she doesn't have enough knowledge and clinical skills to deal with sick patients and this makes her panic:
"...I panic, I must say nobody ever sees it but I'm panicking inside I'm thinking 'Oh now that person's getting breathless now what's gonna happen to them oh now his blood pressure's dropped, what's gonna happen there..' so I'm very, very panicky over the clinical stuff and I always think everybody's gonna die on me and of course they don't so I need to get used to that managing a patient who's ill..."

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APPENDIX D: Field note excerpts observing a Graduate Engineer (GE)

GE is working in a large engineering company that designs and produces equipment for both civil and defence contracts. He is designing a piece of equipment to simulate electronic signals; and is familiar with much commercial chipware and PC boards.

Day 1 morning
A conversation with GE's team leader (TL) concerns the possibility . . . of being able to use the company's old network analyser. This is a test facility that can be used for both spectrum and impedance analysis. They need to use an analyser for a few weeks and there is a high demand for the new analyser. It cannot be tied up that long.

GE's immediate concern is that he needs to double check the performance of two PC cards he proposes to order, and for this he needs to use a spectrum analyser. The PC cards are intended to handle the complex conversions from analog to digital at are required in the equipment he is designing.

During the rest of this day GE spends much time trying to get information about the performance of the chipware he requires. He finds it difficult to locate a relevant manual because the person who is thought to have it is unavailable. He also spends time using Google to search the web for manufacturer's specifications. In both cases his efforts are frustrated.

Day 2
On arrival I go through to GE who has been doing preparatory programming in "Notepad". He does not have the correct "package" yet. He has got as far as he can. He has consulted TL about seeing the senior technician (ST) who will advise on ordering the PC cards, but ST is very busy and not available, so we go to the labs.GE spends the rest of the morning constructing a circuit board in the company's in-house lab. After lunch GE returns to his use of the Internet and uses Google for further searches, again without success.

ST arrives together with TL to discuss the PC card issue. ST says that they already have a PC card that should suit their purpose. It was used some time ago and is documented, but the people who worked on that project and have the experience have left the company. TL picks up on this. *"Have they gone abroad? Could we contact them via e-mail?"* Further discussion follows on their precise needs. They will also need a dedicated computer running an operating system which is not NT. This causes problems because the computer support service has been outsourced to a contractor for IT support and the contractors insist the network only supports NT machines. However, GE's company had just acquired six machines for strict use in the lab which are not network connected, but all are assigned to projects.

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Their discussion of data storage and data speed identifies the need for a CD writer rather than a floppy disk. They will also need a C++ programming software package. If the machine runs Windows 98, they will have to check the position with regard to licences. Their general position is that they prefer to use tried and tested equipment because there is always a risk in not knowing exactly how new stuff will perform. But TL says that the amount of time saved by having a PC card device to do all the data control will justify the extra costs. ST says he will look up the old PC card and will give GE the contact names of people he'll need to go to in order to order the other equipment.

Appendix E: A graduate engineer gets challenging work and opportunities to learn from others

I've also learnt an awful lot about how a real life system actually works, I mean it was, just sort of incomprehensible to think that this great big base station full of all these different cards which communicate together, you know up to that point I'd never really thought much past the card stage, you have a card and it does something, I'd never really thought of the whole system structure.

You don't know an awful lot about the system so a lot of the jobs we get at the moment are sort of basic building block ones, get to know this CAD, get to know about this system. There is some challenge in it, but it's not hugely challenging yet and there's not really any pressure. I do like to be challenged and I like to be able to see something taking shape and be able to step back and say yes that's a good job, well done, sort of thing.

Basically the challenge we face at the moment is looking at old designs and personally working out how they work, our first project with the case WX was challenging in that we didn't know how the thing worked and we actually had to sit down and draw it all up on the white board from basics, and work out what it was doing which was challenging, and when we actually worked it out, it was a sense of, you know, achievement, you'd actually done something and you understood it, we're also fault finding in another board, trying to work out what's wrong with it and that's challenging as well because it's a big board.

It was a clo ecovery problem and Tom basically said ...we want to take that off and put on this old circuitry so we backwards engineered this X to find out how it works and then we had to sort these new parts, because the old ones were obsolete to do the same job, we had to go through various different design reviews because the components we were using weren't up to the job....

Yeah, there's a whole plethora of people who can teach you various bits and it's basically just finding them, the right person. Take George for instance, George yesterday; we didn't

know how to use his rig when we first saw him so we went up there and he showed us how it works, what to do, how to programme the tests as well.

Oh right, yeah, I mean, Tom isn't the most co-operative of people, he's not one to come in and you know, shout and scream either way, sort of done a really good job or really bad job but you know, you know it's appreciated because you know, it's got to be done, he'll come in and say thanks for that or what have you. Oh he often just pops down and has a little chat and you know where you are because he is more of a mate than a manager really, he's, I mean you have a chat with him, what have you. I mean Jack is –, I mean Jack is a bit more, a bit more expressive than Tom, but you know Jack is your manager and there is the line with Jack whereas with Tom there doesn't seem so much like line, more of a mate. I think Tom's possibly more serious and more technical, yeah, Jack's more managerial, I think Tom is happy to be you know, engrossed in the technical side of it, whereas Jack, you know, Jack tends to manage – Yeah, to manage people.

Well, you go to Tom, for a section of the work, what have you, but he is not possibly the most helpful of people...When you actually come to ask a question..., he sometimes doesn't understand what you're asking or doesn't give you a very full answer and I find if I go and speak to Jack, Jack really does sort of lay it down step by step, this is what you need to do, do this, do this. *(More constructive?)* Yeah and you know, if I've got a problem, I really feel it is important, I'd go to Jack or Phillip, yeah, but I mean-(in what respect) It's not that Tom is less approachable, it's just that I find Jeff's input to my situation is more constructive, more helpful.

Appendix F: A graduate engineer gets little feedback or challenging work

I thought I would have more opportunity for learning in the workplace...that's what they told us when we came to the recruitment day, basically there's not as much as opportunities it's really hard and you have to be very proactive, if you want, and when I say very proactive it's very very... *(you say I want this course, I need to go on this one..)* yeah, you have to push, push hard and say you need it, because then they say yeah, we've got training agreement with you and there's no problems, it's not that they don't have that much budget for graduates.

Sometimes he (my manager) tends to underestimate (me). He thinks, I don't ask questions ...and he thinks because I don't ask questions I'm not curious and he thinks that I'm not trying to learn because I don't ask questions, but I ask questions of Harry because he just sits next to me, and of John, the engineer I work with at the moment, not of my manager. *[Does he appreciate your work?]* I don't know, he's never told me. Yes, I have had feedback, but its not on my performance it's on my training, it's on the report that I write for my training; but it doesn't say the job you are doing with us is good ...it's not feedback on my work.

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He never told me what he expects me to produce, whether it's high quality or not; so I have to ask the question when do you want it to be finished, and what sort of things do you want. Maybe he thinks it's my responsibility to do that, so I don't know but that's what happens...I'll just ask him all the details, to make sure you want me to do that and to clarify what he asked me to do first, to know if I'm going to do the right thing. Because, at the beginning I didn't kind of clarify and I was doing things they were not expecting me to do, so it wasn't worthwhile. Now I try to always make sure that I understand exactly what they want by asking questions when they assign me the tasks ...

[What are the factors that you believe can increase your productivity?] At the moment it could be changing jobs because I've been working nine months on the same project and it's becoming long and it would be more stimulating if I was working on another job, I would be more motivated, something new. I would like something that I usually don't deal with or something very, very specific..

[What are the things at the workplace that could discourage you?] Not being listened to, or being told that you are not allowed to make a judgement; being told that you only know how to do that because it's the only thing we've seen you doing. So they ignore all the other skills or any other things you could know.

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